



Epistemic and circumstantial modality in the present perfect (present and imperfective) in French and Italian

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Epistemic and circumstantial modality in the present perfect (present and imperfective) in French and Italian

Alda Mari

December 15, 2009

This work in progress: comments welcome !¹

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1 Introduction

Empirical range The epistemic and abilitative uses of possibility modals in French and Italian under the present, the present perfect and imperfect.

The main focus On the modals in the present and the present perfect in the two languages.

Theoretical desideratum Compositional analysis of present and past epistemic modality in French and Italian.

Main ingredients of the proposal

- event-based semantics;
- relation between events and worlds (Kratzer, 2002);
- no syntactic scope ambiguities;
- distinguish two contributions of the present and the perfect of the present perfect (Pancheva and von Stechow, 2003; de Swart, 2007);
- covert *K* operator in the present (in the spirit of Kratzer 2009).

Main results

- new cartography of the raising / control constructions for modals in Italian and French;
- compositional analysis for the epistemic-abilitative ambiguity in Italian and French.

2 Basic facts about French and Italian

2.1 In French.

- Eventive + imperfect infinitival.

Epistemic and circumstantial (abilitative²).

- (1)
- a. Jean peut_{PRES} déplacer_{IMPERF} la voiture
John might/can move the car
 - b. Jean a pu_{PRES.PERF} déplacer_{IMPERF} la voiture
Jean might/could move the car
 - c. Jean pouvait_{IMPERF} déplacer_{IMPERF} la voiture
Jean might/could move the car

²We consider the abilitative reading to be subsumed under the more general label 'circumstantial', which includes 'occasion readings' a.o. In the paper, unless states otherwise, circumstantial readings are abilitative readings.

- Eventive + perfect infinitival.

Epistemic only.

- (2) a. **Jean peut_{PRES} avoir déplacé_{PERF} la voiture**
John might have moved the car
- b. Jean a pu_{PRES.PERF} avoir déplacé_{PERF} la voiture
Jean might have moved the car
- c. Jean pouvait_{IMPERF} avoir déplacé_{PERF} la voiture
Jean might have moved the car

- Stative + imperfect infinitival.

Epistemic only.

- (3) a. Jean peut_{PRES} être malade_{IMPERF}
John might be sick
- b. Jean a pu_{PRES.PERF} être malade_{IMPERF}
Jean might be sick
- c. Jean pouvait_{IMPERF} être malade_{IMPERF}
Jean might be sick

- Stative + perfect infinitival.

Epistemic only

- (4) a. Jean peut_{PRES} avoir été malade_{PERF}
John might have been be sick
- b. Jean a pu_{PRES.PERF} avoir été malade_{PERF}
Jean might have been sick
- c. Jean pouvait_{IMPERF} avoir été malade_{PERF}
Jean might have been sick

2.2 Italian

- Eventive + imperfect infinitival.

- (5) a. Jean può_{PRES} (benissimo) spostare_{IMPERF} la macchina (Circumstantial and epistemic)
John can/might move the car
- b. **Jean ha potuto_{PRES.PERF} spostare_{IMPERF} la macchina** (Only circumstantial with actuality entailment)
Jean could move the car
- c. Jean poteva_{IMPERF} spostare_{IMPERF} la macchina (Interpretation depends on the perspective)
Jean could move the car

- Eventive + perfect infinitival.

Epistemic only.

- (6) a. Jean può_{PRES} aver spostato_{PERF} la macchina
John might have moved the car
- b. **Jean ha potuto_{PRES.PERF} aver spostato_{PERF} la macchina**
Jean might have moved the car
- c. Jean poteva_{IMPERF} aver spostato_{PERF} la macchina
Jean might have moved the car

- Stative + imperfect infinitival.

Epistemic only (unless agentive interpretation available)

- (7) a. Jean può_{PRES} essere malato_{IMPERF}
John might be sick
- b. **Jean ha potuto_{PRES.PERF} essere malato_{IMPERF}**
Jean might be sick
- c. Jean poteva_{IMPERF} essere malato_{IMPERF}
Jean might be sick

- Stative + perfect infinitival.

Epistemic only.

- (8) a. Jean può_{PRES} (benissimo) essere stato malato_{PERF}
John might have been sick
- b. **Jean ha potuto_{PRES.PERF} essere stato malato_{PERF}**
Jean might have been sick
- c. Jean poteva_{IMPERF} essere stato malato_{PERF}
Jean might have been sick

2.3 Contrasts to be explained

1 Contrast (9a)-(9b) in French:

- (9) a. Jean peut_{PRES} avoir déplacé_{PERF} la voiture
John might have moved the car
- b. Jean a pu_{PRES.PERF} déplacer_{PRES} la voiture
Jean might move the car

2 Contrast (10a)-(10b) in Italian:

- (10) a. Jean può_{PRES} aver spostato la macchina_{PERF} la macchina
John might have moved the car
- b. Jean ha potuto_{PRES.PERF} spostare_{IMPERF} la macchina (Only circumstantial with actuality entailment)
Jean might move the car

3 Contrast between French (9b) and Italian (10b).

4 Contrast (10b)-(11). Epistemic reading with *ha potuto* better accepted in Italian when the infinitival is in the perfect or the property is stative.

- (11) a. Jean ha potuto_{PRES.PERF} benissimo aver spostato_{PERF} la macchina
Jean could have moved the car
b. Jean ha potuto_{PRES.PERF} benissimo essere malato_{IMPERF}
Jean might be sick
c. Jean ha potuto_{PRES.PERF} essere stato malato_{PERF}
Jean might have been sick

Some other facts about the imperfect

- Counterfactual with present perspective. Past perspective is allowed but not easy to obtain.

- (12) Jean poteva_{IMPERF} spostare_{IMPERF} la macchina
Jean could move the car

- Comparison with French (I do not consider here the future/abilitative oriented interpretations).

- (13) Jean pouvait_{IMPERF} très bien déplacer_{IMPERF} la voiture (à ce moment là)
Jean could move the car

3 Syntactic scope ambiguity for the epistemic/circumstantial interpretation

Focus on (14) (= (9)).

- (14) a. Jean peut_{PRES} avoir déplacé_{PERF} la voiture
John can move the car
b. Jean a pu_{PRES.PERF} déplacer_{IMPERF} la voiture, #mais il ne l'a pas fait
Jean could move the car

The question that (14b) arise is: why, if the evidence is located in the present, the modal is under a past ?

- (15) a. Jane a pu prendre le train / *Jane can*_{PRES.PERF} *take the train* (Hacquard, 2006)
b. Given my evidence **now**, ...

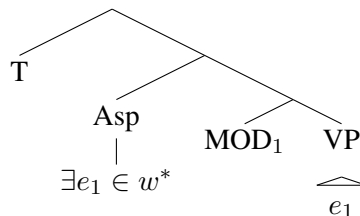
Hacquard answer: the modal is interpreted in the present and is anchored to the speech event. How to get there ?

(14b) has a circumstantial (with AE) and epistemic interpretation. Hacquard (2006) claims that the epistemic reading of (14b) is obtained by interpreting the modal above the perfect, ie. (14b) are considered to be equivalent on the epistemic reading (14a). The circumstantial interpretation of (14b) is obtained by making tense scope above the modal.

Hacquard's view, however, does not reduce scope ambiguity, and more needs to be said about events.

3.1 Circumstantial interpretation

(16)



- The e_1 is closed at Asp.
- Asp comes with its own world argument (w^*)

Hacquard assumes that *a pu* is a perfective, i.e. a combination of *past* + perfective aspect.

$$(17) \quad \llbracket \text{PERFECTIVE} \rrbracket^w = \lambda P \lambda t_i. \exists e [e \in w \ \& \ t(e) \subset t \ \& \ P(e)]$$

$$(18) \quad \llbracket (14b) \rrbracket^w = 1 \text{ iff}$$

$\exists e [e \in w \ \& \ \tau(e) \subseteq t \{t \prec t^*\}] \ \& \ \exists w^* \text{ compatible with circumstances in } w$
s.t. e is a moving-car event in w'

There is an actual event located at a past interval which, in some world compatible with the circumstances, is an event of moving the car by John

- When *aspect* is outside the scope of the modal, its world argument is the matrix world of evaluation (the actual world)
- We obtain an actual event, which in some/all accessible worlds is a P-event.
- *Event identification across worlds*: an event obtains the same description across worlds.
- The event realized in w is an event of pushing the car.

I am going to agree with

- *Pouvoir* (in the present perfect, on the circumstantial reading) is not a predicate of events but a functional element which forms a single unit (not clause, though) with its complement (although I will not assume that there is a single event)

- Relation between events and world arguments (although not the same than in Hacquard)

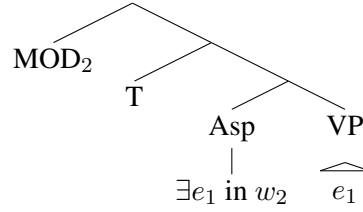
Some other observations Laca (2008) "Temporal perspective is the location of MOD-T with regard to UTT-T, and temporal orientation is the location of EV-T with regard to MOD-T."

"I will adopt the consensual view that past morphology ... does not determine temporal perspective but reflects temporal orientation with regard to UTT-T (MOD-T being at UTT-T)"

- (19)
- Marie a écrit_{PRES.PERF} / *écrivait_{IMPERF} ce roman en moins d'un an
Mary has written / was writing this novel in less than one year
 - Marie a dû_{PRES.PERF} écrire ce roman en moins d'un an. OK EPISTEMIQUE
Mary had to write this novel in less than one year
 - Marie devait_{IMPERF} écrire ce roman en moins d'un an. *EPISTEMIQUE
Mary was having to write this novel in less than one year

3.2 Epistemic interpretation

(20)



- (21) $\llbracket (14a) \rrbracket^{w, B, \leq, c}$ is 1 iff
 $\exists w'$ compatible with what is known in w such that:
 $\exists e[e \text{ in } w' \ \& \ t(e) \subseteq t\{t \prec t^*\} \ \& \ move(e, j, w')]$

I am going to disagree with

- The modal in the present perfect is *uniquely* interpreted at t_u and scopes over the perfect (which thus provides the temporal boundaries of the event in the infinitival).
- The interpretation of (14a) and (14b) are the same.
- Present perfect is considered to contribute a perfective.

4 Data and discussion

4.1 Counter-arguments to the syntactic view: the perfect over ... ?

4.1.1 ILP predicates

Various authors have pointed out shortcomings of the syntactic view (Boogaar, 2007; Homer, 2009; Martin, 2009; von Stechow and Gillies, 2007). Since we do not endorse a scope difference, these criticisms (not all of the founded though³) are not going to apply to our account.

However, given what we are going to say about the relation between the perfect we will have to account for the following fact.

Zwarts (2007) had noted that with ILP the present perfect is strange because it implies that the state is verified a part of the individual's life only (22). Martin (2009) points out that the same problem arises in French.

- (22) #Il a eu les yeux bleu
He had blue eyes

The author claims that the oddity disappears with an infinitival perfect ILP.

- (23) Il peut avoir eu les yeux bleus
He might have had blue eyes

However, we note that the oddity disappears also with *a pu*:

- (24) Il a très bien pu avoir les yeux bleus
He might have blue eyes

Hence the counterargument can show that (19) is not (entirely) correct, but not that (14a) and (14b) are not the same. (we will return on the contrast in (22) vs. (23) and (24) although it is a question that must be addressed also by theories which do not endorse syntactic scope).

³A development will not be provided here

4.1.2 Non equivalence of the two structures?

Some speakers accept that (25a) and (25b) differ in that (25b) means that the consultant tried to withdraw cash at the precise moment when John tried to close the account. (25a) is compatible with a scenario in which the consultant tried to withdraw cash after John has closed the account⁴.

- (25) a. Jean peut avoir fermé le compte quand le consultant a essayé de retirer l'argent
Jean might have closed the account when the consultant tried to withdraw the cash
b. Jean a pu fermer le compte quand le consultant a essayé de retirer l'argent
Jean might close the account when the consultant tried to withdraw cash

This argument is still not entirely satisfactory, though, if it meant to show that the syntactic scope ambiguity explanations are not correct.

4.1.3 Counter-argument to counter-argument

- (26) a. (*)Selon le policier, il a pu être (déjà) mort quand elle est rentrée
According to the policeman, he might be (already) dead when she entered
b. (*)Il peut avoir été (déjà) mort quand elle est rentré
He might have already been dead when she entered
c. Il pouvait_{IMPERF} être mort
He might be dead
(27) *Il a été mort
He has been dead

(26a) is very difficult to accept since *être mort* (??) cannot be bounded (27) (if (26a) is acceptable the time of the event is backward-shifted w.r.t. the time of the modal evaluation (he died before she entered)).

Similarly, the perfect on the infinitival in (26b) makes the sentence difficult to accept, unless one adds 'déjà', again backward shifting the event in the infinitival.

Hence (26a) and (26b) are impossible under the same circumstances, i.e. under the same conditions that make (27) impossible⁵.

The sentence is unproblematic with the imperfective (26c) - which is marked for unboundedness.

These data are properly captured under the syntactic view and no alternative explanation has been provided⁶

Another type of data, pertaining to the control/raising distinctions lead us to revisit the contrast in (??).

⁴This argument has been proposed in Martin's (2009) abstract but is not discussed in Martin's talk

⁵I thank the audience of GENIUS seminar for discussion about the data and Vincent Homer in particular

⁶Martin (2009) proposes that the present perfect on the modal is a point of view aspect and that a sentence like (26b) expresses a past (alethic) possibility evaluated from the present. Since the account is not compositional it is difficult to evaluate how it can tease apart (26a) and (26b), which are correctly captured under the syntactic view. Moreover, in lack of a compositional semantics it is difficult to understand how the various pieces (four temporal intervals) combine and interact with each other and how the interpretation of the sentence is computed (and how the epistemic reading is teased apart from the abilitative one, on the hypothesis the perfect is a point of view aspect).

4.2 Raising and control

4.2.1 An observation

In French, with left-dislocation, *pouvoir* only allows the abilitative reading when it is in the present tense (28b/c) (Guimier, 1989, crediting Sueur, 1979)⁷.

A *pu* allows both the epistemic and the circumstantial interpretations (28a).

- (28)
- a. Aller_{IMPERF} à la pêche, Jean *l'*a (très bien) *pu*_{PRES.PERF} (epistemic / circumstantial)
To go fishing, John that could very well
 - b. Etre allé_{PERF} à la pêche, Jean *le* peut_{PRES} (très bien) (*epistemic)
Having gone fishing, John that could very well
 - c. Etre allé_{PERF} à la pêche pour demain, Jean *le* peut_{PRES} très bien (abilitative ok)
Having gone fishing by tomorrow, John could that very well

• This can be explained if we assume that *peut* introduces a proposition and only part of it is dislocated (the subject of the proposition remains in place in (28b)), whereas *a pu* does not scope over a proposition and allows dislocation of one of its arguments.

4.2.2 The raising-control distinction for modality in English

Brennan (2003). Modals have different types: if they are merged at the VP level, they take a complement of type <e,st> (and they get a root interpretation). Or, they can be merged at the IP-level, take a complement of type <st> and get an epistemic meaning (see also Thomason, 2005).

- (29)
- a. Every radio may get Chicago stations and no radio may get Chicago stations.
 - b. #Every radio can get Chicago stations and no radio can get Chicago stations.

Hacquard correctly explains that (p.118): "with the epistemic reading of (29a), no contradiction arises, suggesting that every is interpreted below the modal: it may be that every radio gets Chicago stations and (it may also be that) no radio gets Chicago stations. However, with ability can in (29b), we get a contradiction: every radio has to be interpreted above the modal".

Counterarguments have been proposed by Bhatt (1989) and Wumbrand (1999).

- (30) There have to be 50 chairs in this room (root and raising)

Hacquard (2006) with Bhatt (1989) and Wumbrand (1999) proposes to treat all modals as raising.

Hacquard makes this conclusion for French on the basis of English evidence, though.

4.2.3 The issues for French

- whether the epistemic and deontic interpretations are, respectively, raising and control.
- whether *a pu* is uniquely control (hence primarily non-root)
- where abilities stand in the distinction

⁷This contrast has been pointed to me by Martin.

Evidence for control vs. raising Tasmowski (1980) has proposed 14 differences that set the distinction (a.o. Ruwet, 1983; Rooryck, 1989). The conclusion in the literature so far: yes, there is a structural difference and the relation between the epistemic and deontic interpretations is diachronic.

One of the major criteria is that impersonal constructions are only compatible with the epistemic reading.

- (31) a. Il doit / peut venir / y avoir 36 personnes à cette réunion
There must / can be 36 people at this meeting
 b. Il doit/peut s'avérer que cela est vrai
It must / can turn out that this is true

Evidence against control vs. raising: from Wumbrand (1999) Impersonal constructions are compatible with the deontic interpretation

- (32) a. Il peut y avoir une fête pour autant qu'il n'y a it pas de bruit
There can be a party, provided there is no noise
 b. Il a pu y avoir une fête grâce à l'intervention de la mairie
There could be a party thanks to the city hall intervention

Subject of control with an infinitive in the passive cannot be inanimate⁸.

- (35) a. The biscuits seem to have been finished by Paul
 b. *The biscuits tried/decided to be finished by Paul
 c. The biscuits may be finished by Paul (Warner 1993)

As for *a pu*, (36)

- (36) Les biscuits ont pu être finis par Jean sans problèmes (ok root interpretation)
The biscuits could be finished by Paul without any problem

Conclusion: deontic interpretation can be raising.

A note: Impersonal constructions, deontics and eventives Impersonal constructions with *a pu* and deontic interpretation only if the predicate is stative.

Eventive with impersonal constructions are ok but only on the epistemic interpretation:

- (37) a. Il peut arriver que cela se passe
It might happen that this happens
 b. Il a pu arriver que cela se passe
It might happen that this happens

⁸Wumbrand explanation relies on the fact that this cannot be a control construction since the biscuits are in no obligation/ability relation. This is not entirely correct. Inanimate can be in an obligation relation.

- (33) Des détecteur de fumée doivent détecter la fumée
Smoke detectors must detect smoke

- (34) Tout doit disparaître !

Impersonal constructions are not compatible with deontic readings if the predicate is eventive.

- (38) a. *Il peut avoir eu lieu une fête pour autant qu'il n'y a it pas de bruit
There can have taken place a party, provided that there is no noise
 b. *Il a pu avoir lieu une fête grace à l'intervention de la mairie
There could take place a party, thanks to the intervention of the city hall

Note that the following can have a non-epistemic interpretation provided a certain degree of agentivity is allowed.

- (39) Il a pu pleuvoir
It could rain

Where is the abilitative reading ? Dislocation and statives The lower the agency, the worse the acceptability.

- (40) a. Elle a pu être belle / *She might be beautiful*
 b. Etre belle, elle l'a très bien pu / *To be beautiful, she this might well (be)*
- (41) a. Il a pu être roi / *He might be the king*
 b. Etre roi, il l'a pu / *To be the king, he this might (be)*
- (42) a. La glace a pu être dans le frigo / *The ice-cream might be in the fridge*
 b. ??Etre dans le frigo, la glace l'a pu / *To be in the fridge, the ice cream this might (be)*
- (43) a. Le café a pu être chaud / *The coffee might be cold*
 b. ??Etre chaud, le cafe l'a pu / *To be cold, the coffee this might (be)*

Conclusion: when epistemic only (no abilitative ambiguity), left-dislocation is not allowed.

In other terms: the epistemic reading is possible with statives and *a pu*, but this does not correspond to the same construction that is obtained with eventives (+ agency).

4.2.4 Correlation with Italian

When a stative is embedded under the modal *ha potuto* maintains its epistemic reading (n.b. the question of restructuring does not arise since the infinitival keeps its own auxiliary).

- (44) a. Jean ha potuto_{PRES.PERF} benissimo aver spostato la macchina_{PERF}
Jean could have moved the car
 b. Jean ha potuto_{PRES.PERF} benissimo essere malato_{IMPERF}
Jean could be sick
 c. Jean ha potuto_{PRES.PERF} essere stato malato_{PERF}
Jean could be sick

4.2.5 Dislocation in Italian

- (45) a. Ha potuto essere re (ok epistemic)
He might be the king
b. Essere re, lo ha potuto (abilitative only)
To be king, he might be
- (46) a. Il caffè ha potuto essere freddo (ok epistemic)
The coffee might be cold
b. *Essere freddo, il caffè lo ha potuto
To be cold, the coffee might be

4.3 Conclusion

Two ways distinction:

- Control-like: *peut* abilitative only
- Control-like: *a pu* + eventive and animate - epistemic reading available, in concurrence with the abilitative reading (28a) and (28c).
- Raising-like : *peut* / *a pu* + stative (and inanimate) - not in concurrence with abilitative reading (42)-(43).

Answers to questions:

- (i) Whether the epistemic and deontic interpretations are, respectively, raising and control.

Answer: no, because of (32b) and (36)

- (ii) Whether *a pu* is uniquely control (hence primarily non-root)

Answer: *a pu* can be

- raising with statives ((32) for the deontic); ((42)-(43) for the epistemic)

- raising with eventives with impersonal constructions (37) - root interpretation is not allowed.

- control with eventives + agency. When it is control it is both epistemic and circumstantial (28a) and (40)-(41).

- (iii) where abilities stand in the distinction

Answer: abilities are control-like (28a) and (28c)

- (iv) Deontic are raising in French as well (Wumbrand, 1999)

I will thus adopt the view that there is a structural difference between abilitative+epistemic interpretation with eventives+agency; epistemic interpretation with statives⁹.

⁹Nonetheless, as we are going to show this does not impede to treat both eventives and statives as providing a proposition. The crucial point is where the event argument is closed, see *infra*

5 Analysis

5.1 Starting hypothesis

I adopt Homer's (2009) temporo-aspectual structure (from Pancheva and von Stechow 2003).

$$(47) \quad [_{TP} T [_{PerfP} \text{Perfect} [_{Mod} \text{Modal} [_{AspP} \text{Aspect} [_{vP} P]]]]]$$

- The present perfect is considered to provide *present + perfect* (vs. Hacquard 2006).

5.2 The present perfect

Present perfect puzzle (McCoard, 1978; Klein, 1982 a.o.). In English, the present perfect, cannot combine with 'positional' adverbials.

$$(48) \quad * \text{Alicia has danced on Monday / yesterday / at 10 o'clock. (Pancheva and von Stechow, 2003)}$$

This prohibition is not encountered in French and Italian (Giorgi and Pianesi 1998).

$$(49) \quad \text{Alicia ha ballato lunedì / alle 10 / ora}$$

Various explanations has been provided, most of them appealing to two temporal intervals.

Here we adopt Kamp and Reyle (1993) and de Swart (2007) classical positions for the *perfect* in French, claiming that the perfect operates on an eventuality e and introduces the state e' of that eventuality as immediately following e . The perfect is tense neutral (and generalizes over the present, past and future perfect¹⁰).

Distinguish between two contributions of the present perfect (PP).

- The first one is a (bounded) past event (e) (e.g. de Swart, 2007; Klein, 1994).
- The second contribution of the PP is the consequent state e' of e , which overlaps with t_u .

5.3 Modals in the present perfect

- We standardly assume that existential closure can occur at any stage of the derivation.

- t_u is also the temporal localization of the evidence (Hacquard, 2006, p. 25; e.g. 'according to' phrase in (26a))¹¹

- We make the hypothesis that **the consequent state e' is an anchor at t_u for a knowledge operator K_j** (see also Kratzer, 2009), with the intended interpretation 'the speaker (j) knows that' (Hintikka, 1962) - in (26a) j = the policeman.¹²

¹⁰For the future perfect, see Mari, 2009b, with some notes on epistemic modality. Mari and Martin (2007) argued in line with de Swart (2007) that the perfect denotes a bounded possibility, but do not mention the role of the result state in the computation of the meanings (abilitative and epistemic).

¹¹ e can also set the temporal evaluation of the modal, but, in this case, the goal-oriented interpretation is obtained.

- (50) a. Jane a dû prendre le train (Hacquard, 2006; p. 25)
Jane had to take the train
 b. In view of the circumstances then, Jane had to take the train then

¹²For related discussion about the present perfect as an epistemic modal, see Izwrosky, 1997; Iatridou, 2000)

- K has the purpose of allowing epistemic uncertainty via calculation of (non-)factivity (see *infra*).
- In the spirit of Kratzer (1990; 2009) \downarrow is a function that operates over events and returns the world at which its event argument is located.
- \Diamond symbolizes metaphysical possibility.

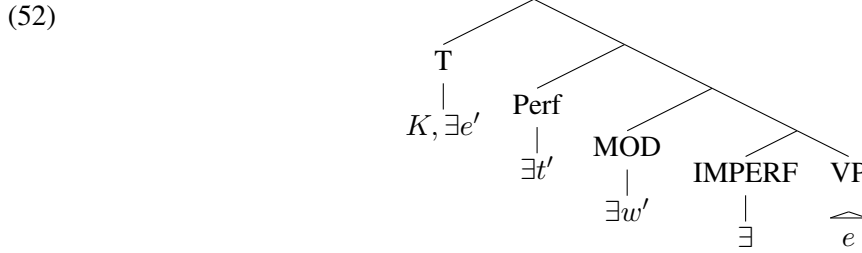
- (51)
- $[_{TP} a [_{PerfP} -u [_{Mod} p- [_{AspP} Pres/Perf [_{vP} P]]]]]$
 - $PRES(PERF(\Diamond(IMPERF/PERF(P_{eventive/stative}))))$
 - $K_j(PERF(\Diamond(IMPERF/PERF(P_{eventive/stative}))))^{13}$

5.4 The semantics

We adopt a $W \times T$ forward branching structure (Thomason, 1984). A three place relation \simeq on $T \times W \times W$ is defined, s.t. (i) for all $t \in T \simeq_t$ is an equivalence relation; (ii) for any $w, w' \in W$ and $t, t' \in T$, if $w' \simeq_t w$ and $t' \prec t$ then $w' \simeq_{t'} w$. In words: any two worlds (which are maximal sets of times) overlap until they branch. We assume that $\tau(e, w)$ returns the spatio/temporal trace of an event e in the world w .

5.4.1 French/Italian: *a pul/ha potuto* + statives

Raising-like; the modal selects a proposition. The event argument is existentially closed under MOD.



- (53)
- $$PERF(\Diamond(IMPERF(P_{stative}))) = \phi = \lambda w \lambda P \exists t' \exists w' \exists e (t' \prec t_u \wedge w' \simeq_{t'} w \wedge (P(e) \wedge \tau(e, w') \subseteq t'))$$
- $$PRES(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u}$$

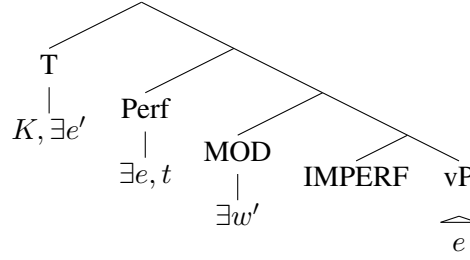
- Calculation of factivity: $\llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u}$ only if $\llbracket \phi \rrbracket^{(\downarrow e'), t_u} = 1$.
- Since e is in the scope of w' , the world returned by the consequent state e' of e will be w' .
 $(\downarrow e') = w'$
- The speaker knows that an event e occurred in w' , but cannot conclude that w is the actual world.

5.4.2 French/Italian *a pu/ha potuto* + eventive

The options Control-like structures. (**One can still assume that the modal selects a proposition**, although the event is closed at PerfP; see Hacquard's strategy below.). The event argument is existentially closed at PerfP.

¹³This decomposition and its corresponding LF have been presented in Mari, 2009b, where I have argued that K signals indirect evidence, in this and other epistemic construals, in line with von Stechow and Gillies, 2007.

(54)



$$(55) \quad PERF(\Diamond(IMPERF(P_{eventive}))) = \phi = \lambda w \lambda P \exists e \exists t' \exists w' (t' \prec t_u \wedge w' \simeq_{t'} w \wedge (P(e) \wedge \tau(e, w') \subseteq t'))$$

$$PRES(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u}$$

- $K(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u}$ only if $\llbracket \phi \rrbracket^{(\downarrow e'), t_u} = 1$.
- e is not bound to a particular world (Perf only contributes existential quantification)
- the world returned by the consequent state e' of e will be either w' or w . ($\downarrow e' = w'$ or w).

The case of Italian *ha potuto* + eventive In Italian, this choice does not exist. *ha potuto* is restructuring (Rizzi, 1982).

In (57b), existential closure of e takes place above the modal (above \Diamond , though, and not above K) at PerfP on the epistemic reading as well.

Italian, given the same structure, *does not* allow the epistemic reading of (56).

(56) (i.) Giovanni ha potuto spostare il tavolo / (ii.) è potuto venire

John could moved the table / could come

In Italian, the auxiliary signals that the consequent state is that of the event as non-modalized (this is clear in (56ii.)-(57a) where 'è' is unambiguously the auxiliary expected by 'venire'), i.e., in (57b).

$\downarrow e' = w$ (and not w').

$$(57) \quad \begin{aligned} \text{a.} \quad & [_{TP} \text{'è'} [_{PerfP} \text{-uto} [_{Mod} \text{po-} [_{AspP} \text{Imperf} [_{vP} P]]]]] \\ \text{b.} \quad & PERF(\Diamond(IMPERF(P_{eventive}))) = \phi = \lambda w \lambda P \exists e \exists t' \exists w' (t' \prec t_u \wedge w' \simeq_{t'} w \wedge (P(e) \wedge \tau(e, w') \subseteq t')) \\ & PRES(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u} \end{aligned}$$

$$\llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u} = 1 \text{ only if } \llbracket \phi \rrbracket^{(\downarrow e'), t_u} = 1$$

- The sentence states that the speaker knows that there is a world in which e has occurred and that the consequent state holds in the actual world.

- The world w' in which e has occurred is thus identified to the actual one (since the result of e holds in w it follows that $w' = w$) and the actuality entailment AE is derived (58)¹⁴.

(58) Ha potuto spostare la macchina, #ma non lo ha fatto

He could move the car but he did not do it

¹⁴This syntax-semantic explanation provides a robust ground for understanding where the epistemological constraint on abilities ('he did it, hence he was able to do it') comes from (Mari and Martin, 2009: "Perfective and Imperfective in French: Kinds of abilities and actuality entailment. Available at: <http://jeannicod.ccsd.cnrs.fr/docs/00/41/61/68/PDF/CanPerfectiveImperfective.pdf> (see feature iv, p. 10)). Here the syntax-semantic analysis provides: "it is known that the result of P holds in w , hence we conclude that s/he could do P in w (i.e. the world in which P occurred was w)."

Comparison with Hacquard. One of Hacquard's results -reduced to a scopal issue - pertains to reconstruction properties of modals. The author explains the unavailability of the epistemic interpretation of the Italian *ha potuto* appealing to the restructuring properties of *potere* (the auxiliary 'be' on the 'have'-expecting-*potere* in (56ii.) reveals reconstruction). Hacquard concludes that the sentence is monoclausal (see e.g. Rizzi, 1982) and the event in the infinitival is existentially closed above the modal. For us, the event in the infinitival is closed above \Diamond but not over K , at the consequent state.

Back to French In French the auxiliary provides no information as to whether the result state e' of e holds at w (i.e. it is the result state of the event non-modalized) or at w' (i.e. it is the result state of the event, modalized). The two options are open.

Epistemic interpretation

$$(59) \quad PERF(\Diamond(IMPERF(P_{eventive}))) = \phi = \lambda w \lambda P \exists e \exists t' \exists w' (t' \prec t_u \wedge w' \simeq_{t'} w \wedge (P(e) \wedge \tau(e, w') \subseteq t'))$$

$$PRES(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u}$$

- $K(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u}$ only if $\llbracket \phi \rrbracket^{(\downarrow e'), t_u} = 1$.
- Since e is not bound to a particular world, the world returned by the consequent state e' of e will be either w' or w .
- Hence $(\downarrow e') = w' \text{ or } w$.

$\downarrow e'$ returns the world in which e' occurred, namely w' , which is not guaranteed to be the actual world.

Consequently the speaker cannot hold that ϕ is true in the actual world. (for related discussion, see Izvorski, 1997; Iatridou, 2000).

Circumstantial interpretation

$$(60) \quad PERF(\Diamond(IMPERF(P_{eventive}))) = \phi = \lambda w \lambda P \exists e \exists t' \exists w' (t' \prec t_u \wedge w' \simeq_{t'} w \wedge (P(e) \wedge \tau(e, w') \subseteq t'))$$

$$PRES(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u}$$

$$K(\phi) = \llbracket K_j(\phi) \rrbracket^{(\downarrow e'), t_u} \text{ only if } \llbracket \phi \rrbracket^{(\downarrow e'), t_u} = 1.$$

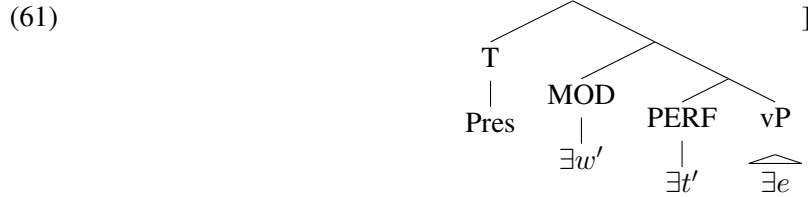
$\downarrow e' = w$ (and not w') and the actuality entailment arises.

Again, the speaker knows that there is a world in which e has occurred and that the consequence state holds in the actual world. The world w' in which e has occurred is thus identified to the actual one (since the result of e holds in w it follows that $w' = w$) and the actuality entailment is derived (58).

5.5 The modal in the present

When *pouvoir* in the present tense is interpreted as scoping over a proposition, the epistemic interpretation is obtained (recall that when dislocation is possible -i.e. does not scope over a proposition - only the abilitative reading is available (28c)).

As above, the proposition is obtained by existentially closing the event contributed by the infinitive (at AspP in this case) and by providing e with temporal specification. PRES in (62) locates speaker's belief at t_u and the modal basis to which w' and w belong is epistemic. PERF on the infinitival locates the event at a time $t' \prec t_u$. B is the belief operator. (62) states that at t_u the speaker believes that an event e described as P occurred at t' .



(62) $\text{PRES}(B_j(\text{PERF}(\text{Peventive/stative}))) - \lambda t \lambda w \lambda P \exists w'(w' \in MB_j(\langle w, t_u \rangle) \& \exists t' \exists e (t' \prec t_u \wedge P(e) \wedge \tau(e, w') \subseteq t'))$

6 Data (to be) explained

6.1 Results so far

We have found out that

- deontic / epistemic modals do not correlate with control / raising constructions (deontic can be raising)
- *a pu* + eventive can be *control*-like and have an *epistemic* interpretation
- the control-like epistemic interpretation of *a pu* + eventive hinges on the availability of the abilitative reading

Consequences:

- When a control like structure is available, the event argument of the infinitival is closed at Perf (i.e. above \diamond but not above K at Pres)

The account explains in a principled way:

- the strange correlation between epistemic and control-like behavior
- the epistemic-circumstantial ambiguity in French
- the unavailability of the epistemic reading of *ha potuto* + eventive in Italian
- the availability of the epistemic interpretation of Italian *ha potuto* + statives
- the fact that in Italian AE is mandatory with eventives

6.2 Back to the remaining data

Non-synonymity and counterexamples

- (63) a. Il peut avoir fermé le compte quand le consultant a essayé de retirer l'argent *He might have closed the account when the consultant tried to withdraw the cash*
b. Il a pu fermer le compte quand le consultant a essayé de retirer l'argent *He might close the account when the consultant tried to withdraw cash*

Assuming that 'quand' (*when*) signals that the event in the main clause and in the adjunct clause are concomitant (Le Draoulec, 1997), it is predicted that the time at which the accountant tries to withdraw cash (t') in (63a) is the time of the event described as P . However, since the result of having closed the account holds at the utterance time, the sentence also has the natural interpretation that the account being closed and the consultant withdrawing cash are concomitant.

When *pouvoir* is in the present (63b), the time of the event precedes t_u , which is the time of the temporal evaluation of the main clause but not the time of the event. However, since the result of having closed the account holds at the utterance time, the sentence also has the natural interpretation that the account being closed and the consultant withdrawing cash are concomitant (and not necessarily that the account is already closed).

- (64) a. (*)Selon le policier, il a pu être (déjà) mort quand elle est rentrée
According to the policeman, he might have already died when she entered
b. (*)Il peut déjà avoir été mort quand elle est rentrée
He might have already been dead when she entered
c. Il pouvait_{IMPERF} être mort
He might be dead

As for (64a), the account predicts that, since the state of being dead would always necessarily exceed any temporal boundary (including that of death itself), the state interpretation of *être mort* is impossible. Note that *Marie a pu être belle* / *Mary could be beautiful* is acceptable since *être belle* is bounded to Mary's life.

The question of ILP (65a), is it really a counterargument?

It is not a counter-argument to non-synonymity of (65b)-(65c).

What this shows is that under the modal an ILP can be bounded and an answer to this question must be provided also by non-scoping theories (since in (65c) the perfect scopes below the modal and the event is bounded).

We can explain that a bounded event under a modal and a bounded event *tout court* do not obey the same pattern of inferences.

- (65) a. *Il a eu les yeux bleus
He has had blue eyes
b. Il a pu_{PRES.PERF} avoir_{PRES} les yeux bleus
He might have blue eyes
c. Il peut_{PRES} avoir eu_{PERF} les yeux bleus
He might have had blue eyes

Observation about (65). The predicates targeted are those whose temporal extent cannot be modified without producing a particular interpretative effect (Jäger, 2001):

- (66) Il a eu_{PRES.PERF} les yeux bleus pendant un an / toute sa vie
He has had blue eyes during one year / his whole life

Toute sa vie can be used if one intends to cancel the inference of persistence associated with ILP (Condoravdi, 1992; Magri, 2008), so why use the perfect if not to signal that the property is not persistent ?

ILP under the modal.

- The imperfective (the property holds-does not hold in two different branches)

- (67) Il pouvait_{IMPERF} avoir les yeux bleu
He might have blue eyes

- The present perfect (the result property holds-does not hold in two different branches)

- (68) Il a pu_{PRES.PERF} avoir les yeux bleu
He might have blue eyes

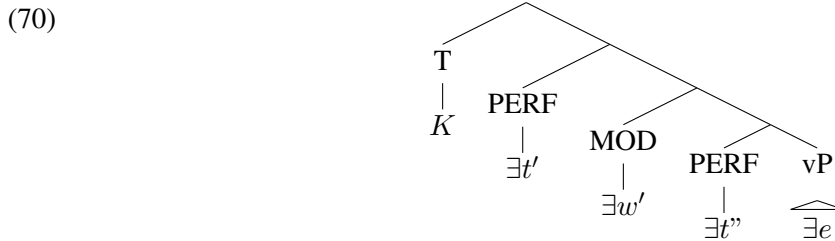
The property is instantiated in a world at a certain time and one does not know at the actual world at the utterance time whether the actual world is the one in which the property obtained (in which the consequent state is met). With the property being bounded and being under the scope of the modal, two different branches are provided, at which the consequent states $\neg\phi$ and ϕ are located. In the present, uncertainty is derived.

6.3 Double perfect

This account explains cases with double perfect (on the modal and on the infinitival) - there is a third temporal anchor $t'' \prec t' \prec t_u$ for the event of being sick whose result persists at t' . (?not easily explained if the perfect is already on the infinitival).

- (69) a. A ce moment là il a déjà pu avoir été malade. Il avait contracté cette maladie deux ans auparavant.
At that time (t') he might already been sick. He had got that sickness two years before.
- b.

Raising construction, the event is closed at VP.



- (71) $\phi = \lambda w \lambda P \exists t' \exists w' (t' \prec t_u \wedge w' \simeq_{t'} w \wedge \exists t'' \exists e (t'' \prec t' \wedge P(e) \wedge \tau(e, w') \subseteq t''))$
 $\llbracket K_j(\phi) \rrbracket (\downarrow e'), t_u$

7 Non grammaticalized anchoring events

What kind of event allows anchoring indirect evidence ? (see Kratzer, 2009).

In French, the simple past does not (so easily) allow the epistemic interpretation because it lacks the consequent state event. The event that anchors knowledge must be grammaticalized.

However, some cases in the simple past are attested:

- (72) Ce site tant vanté évoquant la Tour Magdala **put**_{SIMPLE.PAST} très bien être le modèle qui inspira Béranger Saunière pour construire celle de son domaine à Rennes le ...

This so-much-celebrated site evoking the Magdala Tour might well be the model that inspired ...

www.societe-perillos.com/girona_rech_1.html

In Italian *può darsi* is a dedicated form for epistemic modality. There are attested in cases in the simple past.

- (73) a. **Potè**_{SIMPLE.PAST} benissimo darsi che s'introducesse il costume creduto conveniente alle circostanze, ...

It might well be the case that the costume convenient for the circumstances were introduced

books.google.fr/books?id=t44KAAAAIAAJ...

- b. L'Šesemplare delle Preghiere cristiane in forma di meditazioni che si conserva al monastero di Montecassino (Palermo, 1775) potè essere stato donato dallo stesso curatore

The exemplar of the ŠPreghiere cristiane in forma di meditazioniŠ which is in the Montecassino monastery might have been given by the curator himself

[books.google.fr/books?isbn=2600011250.....](http://books.google.fr/books?isbn=2600011250...)

Laca (2008) notes that the Spanish perfective (+ eventive) allows the epistemic reading (besides the circumstantial with actuality entailment reading).

- (74) Pedro pudo tomar el tren de las 3.50

Pedro managed to take the 3.50 train/Pedro might have taken the 3.50 train

See also English:

- (75) Kafka had to suffer from migraines (Kratzer, 2009)

Stowell (2007) has proposed to decompose tenses into a temporal ordering predicate and two time-denoting arguments corresponding to covert a reference time (RT) argument and an eventuality time (ET) argument containing the verb phrase.

- (76) $\llbracket \text{PAST} \rrbracket^{w,g}(u)(v) = 1$ iff (v) precedes (u) in time

The time denoting argument for the reference time is a suitable anchor in some languages for indirect evidence, hence for *K* (see Kratzer, 2009 for extended discussion).

8 A note on the imperfect

Still in progress ...

Differently from the present perfect which provides two temporal intervals for evaluating the modality, the imperfect provides an unbounded interval, at each subinterval of which the modal evaluation can occur. The imperfect allows locating K at any subinterval of the unbounded interval (for insights on this, see Boogaar, 2005; Stowell, 2007b). See also Hacquard (2006) and Homer (2009) for an extended analysis of the imperfect in French.

See del Prete (2009), for the imperfect in Italian.

The modality in the imperfect scopes over a proposition. The event variable is closed at AspP.

- (77) a. Ieri era ubriaco
 Yesterday he was drunk
 b. Oggi era ubriaco
 Today he was drunk

For the imperfect modal in Italian:

(TP Past [$ImPerfP$ -eva [Mod po- [$AspP$ Pres [vP P]]]]]

- (78) Poteva essere alto (present perspective)
 He might be tall

- (79) $\lambda w \lambda P \exists t' (t' \prec t_u \wedge \exists w' \exists e (w' \simeq_{t'} w \wedge t' \circ \tau(e, w') \wedge P(e)))$
 $\llbracket K_j(\phi) \rrbracket^{(\downarrow e), t_u} = 1$ only if $(\phi)^{w', t_u}$

The speaker knows at t_u that ϕ is possible at t_u (because the predicate is stative \circ).

- (80) Poteva essere alto (past perspective)
 He might be tall

- (81) $\lambda w \lambda P \exists t' (t' \prec t_u \wedge \exists w' \exists e (w' \simeq_{t'} w \wedge t' \circ \tau(e, w') \wedge P(e)))$
 $\llbracket K_j(\phi) \rrbracket^{(\downarrow e), t'} = 1$ only if $(\phi)^{w', t'}$

The speaker knew at t' that ϕ was possible at t' .

As with eventives, we do not consider future oriented interpretations and focus on the availability of epistemic ones.

- (82) Poteva andarsene (present perspective - counterfactual)
 He might go away

- (83) $\lambda w \lambda P \exists t' (t' \prec t_u \wedge \exists w' \exists e (w' \simeq_{t'} w \wedge t' \subseteq \tau(e, w') \wedge P(e)))$
 $\llbracket K_j(\phi) \rrbracket^{(\downarrow e), t_u} = 1$ only if $(\phi)^{w', t_u}$

The speaker knows at t_u that ϕ was possible at t' and that it is no longer possible (because P is eventive). (hence builds a counterfactual world (see Hacquard, 2006; Condoravdi, 2001)).

- (84) Poteva andarsene (past perspective)
 He might go away

- (85) $\lambda w \lambda P \exists t' (t' \prec t_u \wedge \exists w' \exists e (w' \simeq_{t'} w \wedge t' \subseteq \tau(e, w') \wedge P(e)))$
 $\llbracket K_j(\phi) \rrbracket^{(\downarrow e), t'} = 1$ only if $(\phi)^{w', t'}$

The speaker knew at t' that it was possible that ϕ at t' .

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